

Huebener, Mathias; Waights, Sevrin; Spieß, C. Katharina

**Working Paper**

## Well-Being throughout the COVID-19 Pandemic in Germany: Gendered Effects of Daycare and School Closures

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**Mathias Huebener**

*Federal Institute for Population Research (BiB) and IZA*

**Sevrin Waights**

*Humboldt University*

**Katharina C. Spiess**

*Federal Institute for Population Research (BiB), IZA and Johannes Gutenberg University Mainz*

APRIL 2024

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**IZA – Institute of Labor Economics**

Schaumburg-Lippe-Straße 5–9  
53113 Bonn, Germany

Phone: +49-228-3894-0  
Email: [publications@iza.org](mailto:publications@iza.org)

[www.iza.org](http://www.iza.org)

## ABSTRACT

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# Well-Being throughout the COVID-19 Pandemic in Germany: Gendered Effects of Daycare and School Closures\*

In this chapter, we aim to improve the understanding of the well-being impacts of the COVID-19 pandemic. We provide an overview of the existing literature and carry out empirical analysis aimed at addressing certain gaps in the knowledge. Specifically, we examine the evolution of parental well-being over the course of the COVID-19 pandemic in Germany and relate changes to the severity of restrictions on school and daycare facilities. Our analysis makes use of unique data from the COMPASS survey collected at 17 different points throughout the pandemic in Germany. We find that there is a large difference in retrospective stress-feelings between women and men that is present only for individuals living with children under the age of 12. We also show that the size of the gender gap in life satisfaction fluctuates over time in a way that is related to the severity of restrictions to daycare and school operation.

**JEL Classification:** I31, I24, J1, I20

**Keywords:** COVID-19, gender inequality, well-being, school closures

**Corresponding author:**

Mathias Huebener  
Federal Institute for Population Research (BiB)  
Friedrich-Ebert-Allee 4  
65185 Wiesbaden  
Germany  
E-mail: [mathias.huebener@bib.bund.de](mailto:mathias.huebener@bib.bund.de)

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## 1. Introduction

The COVID-19 pandemic as well as the measures introduced to curb the spread of the virus resulted in dramatic changes to the daily lives of billions of people around the world. Stressors such as restrictions on social interaction and fear of the virus have significant implications for individual mental health and overall well-being. Moreover, closures of schools and daycare facilities meant that children and their parents were subject to an additional level of stress when navigating the pandemic. While there exist many studies that look at the detrimental impacts of the pandemic on well-being there is overall less clarity as to the specific channels for particular groups of the population. There is also little evidence that provides a comprehensive picture of well-being dynamics over the course of the pandemic.

In this chapter, we aim to address these areas of the literature by examining the impacts on well-being of parents, relating these to changes in the severity of restrictions on school and daycare facilities over the course of the COVID-19 pandemic in Germany. Germany is a particularly interesting case, as school and daycare closures were comparably long (e.g. Freundl et al., 2021). We draw a comprehensive picture of feelings of stress and well-being over the entire course of the pandemic, both during the midst of high infection rates and restrictive government mandates, but also in later phases. Such a view allows us to assess the extent to which impacts depend on contemporaneous severity and the extent to which impacts are persistent. We differentiate in detail by the age of the child and by parents' and other adult's gender thereby drawing a nuanced picture of the which groups struggled the most during the pandemic and shedding light onto the potential channels of effect. Finally, we link changes in well-being to regional data on school restrictions and establish a (causal) link between daycare and school restrictions and well-being.

Our analysis makes use of unique data from the COMPASS survey in Germany. The COMPASS survey provides us with two forms of data: the first is real-time data on individual life satisfaction (as well as satisfaction with other elements of life such as child care or work) collected at 17 different point throughout the course of the pandemic from March 2020 until August 2022. The second is data on retrospective feelings of stress collected in August 2022 that asks individuals to think back on the pandemic as a whole. We examine the data in two separate analyses that are designed to strengthen

and complement one another.

We start by examining the difference in retrospective stress between men and women during the pandemic and how this changes with the presence of children of different ages. We do so by regressing an indicator of strong levels of retrospective stress on a female dummy variable for different samples by child age. We find that there is a large difference in retrospective stress-feelings between women and men that is present only for individuals living with children under the age of 12. We then document the evolution of life-satisfaction with the real-time data. These data are consistent with the retrospective data in that they show a significant gap in life-satisfaction with women at lower levels than men during the pandemic, and that the gap is larger for parents of younger children. However, the data also show that the size of the gap fluctuates over time in a way that appears related to severity of restrictions to daycare and school operation. Indeed, our fixed effects regression confirms that daycare and school restrictions have large negative impacts on women's life satisfaction, but no significant impacts for men.

Our findings contribute significantly to the understanding of the well-being impacts of the COVID-19 pandemic. As we show in our review of the literature, it is widely documented that negative well-being impacts are both strongly gendered and related to the severity of the pandemic over place and time, however, there is much less evidence that is able to disentangle the effects of pandemic severity from specific restrictions. We are able to show that the severity of restrictions to school and daycare operation worsen parental well-being especially for mothers of young children.

The chapter is structured as follows: section 2 presents the literature review, section 3 outlines the specific institutional context and course of the pandemic in Germany, section 4 provides a discussion of our data, section 5 lays out our empirical methods, section 6 presents our results, and section 7 concludes.

## **2. Literature**

In just a few years, a huge literature has emerged on the well-being impacts of the Covid-19 pandemic. We review the evidence across many different geographical contexts, different types of individual and different measurement approaches. The vast majority of studies came to the conclusion that the Covid-19 pandemic had a negative effect on

people’s well-being.<sup>1</sup> While this headline finding may not be surprising, a more detailed look at the studies provides deeper insights. Studies were able to identify which specific aspects of the pandemic, such as isolation or home-schooling, as well as which personal characteristics, such as personal resilience, helped mitigate or worsen the negative impact on well-being. We first review the evidence on well-being impacts, generally, before looking at studies that focus specifically on parents.

### *2.1. Impacts on well-being generally*

Although COVID-19 was a global pandemic, its well-being impacts differed significantly across locations and time period. As Bachmann et al. (2023) report, life satisfaction was negatively correlated with the spread of the virus in Northern Europe, while this association was not significant in Southern and Western Europe. Well-being also changed within places over time in a way that corresponded to COVID-19 waves and the severity of restrictions (Fancourt et al., 2022).<sup>2</sup> There is a lack of clarity as to whether it is differences in the level of restrictions or in the country-specific pandemic severity (regardless of restrictions) that is the cause of such spatial and temporal patterns.

Several studies point to restrictions being to blame. For instance, Cheng et al. (2020) find declines in overall life satisfaction when a nationwide lockdown was introduced in Singapore. Even after lifting the lockdown, the pre-pandemic level for life satisfaction was not reached. Furthermore, Ammar et al. (2020) find increased psychological strain due to enforced home confinement in their international study, suggesting this effect is due to reduced social participation. Rossouw et al. (2021) make use of a happiness index in New Zealand (which is based on a sentiment analysis of Twitter feeds) finding that the COVID-19 related restrictions on mobility made people significantly more unhappy.

Other studies, however, argue that lockdown policies are not the major contributor to increased negative effects, but rather the country-specific pandemic severity, and that lockdowns themselves may improve well-being. Indeed, fear of the virus has been shown to be a significant contributor to anxiety across studies (e.g. Özmen et al., 2021, Weber et al.,

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<sup>1</sup>When discussing the literature we use the term ‘well-being’ as a broad concept that comprises both life satisfaction outcomes and mental health outcomes. However, we also sometimes refer to specific outcomes used in the paper (e.g. anxiety), where appropriate.

<sup>2</sup>Note that there seems to be an adaptation effect between waves (Schmidtke et al., 2021) and a relatively quick recovery of the initially and during waves deteriorated mental health as the pandemic attenuates over time (Weber et al., 2023, Easterlin and O’Connor, 2023).

2023). Both Foa et al. (2020) in the United Kingdom and of Zhang et al. (2020) for China observe smaller reductions in well-being with longer lockdowns. Other studies find that it is satisfaction with the government’s handling of the pandemic that determines well-being (e.g. Long, 2021, who looked at China, the US, Japan, Italy, the United Kingdom and Korea).

Beyond pandemic severity and restrictions, many studies show that individual behaviours and characteristics can have alleviate or worsen well-being impacts. In terms of activities, spending time outdoors, exercising, going for walks, gardening, pursuing hobbies, and taking care of children had positive effects while home-schooling and obtaining information about COVID-19 reduced well-being of respondents (e.g. Lades et al., 2020, Gao et al., 2020). In terms of individual characteristics, the negative well-being impacts are typically stronger for women, the young, those with a lower socio-economic status, those with pre-existing mental health conditions, and for those either living alone or together with children (e.g. Özmen et al., 2021, Fancourt et al., 2022, Pierce et al., 2020, O’Connor et al., 2021, Helliwell et al., 2022, Yavorsky et al., 2021). Children and adolescents are also documented by many studies to have experienced significant negative mental health impacts as a result of the pandemic (see e.g. metastudies by Ludwig-Walz et al., 2023, 2022)

Etheridge and Spantig (2022) point out that a part of the gender differences may be explained by social factors – especially loneliness (e.g. 20% of the women and 12% of the male respondents reported an increase in loneliness). Leptineur et al. (2022), find the gender loneliness gap doubled during the pandemic compared to 2017 - having strong negative effects on women’s life satisfaction. However, a potentially more significant explanation in many contexts in the increase in caring responsibilities (e.g. Giurge et al., 2021). A clearer view on this point is provided by studies of parents in the next section.

## *2.2. Studies focussing on parents*

Throughout the COVID-19 pandemic families were identified as a particularly vulnerable group. Huebener et al. (2021) difference-in-differences estimation provides evidence for significant declines in satisfaction for parents, especially parents of young children, relative to individuals without dependent children. They underscore the pivotal impact of school and daycare closures on parental well-being during the pandemic. However, a reduction in parental well-being and heightened levels of stress during the pandemic



is a consistent finding internationally across many studies (e.g. Al Gharaibeh and Gibson, 2022, Calvano et al., 2022, Gassmann-Pines et al., 2020, Bourion-Bédès et al., 2023, Möhring et al., 2021, Westrupp et al., 2021, Patrick et al., 2020, Penna et al., 2023). Increased childcare responsibilities for parents are cited in many of these studies as a particular stressor, along with additional worries over income and health. As with studies without a parental focus, the well-being impacts for parents is seen to be stronger for those with lower socio-economic status and income (e.g. Westrupp et al., 2021, Huebener et al., 2021, Maly-Motta et al., 2023, Gayatri and Puspitasari, 2022)

One of the most frequently analysed distinctions we found in the literature was gender differences in well-being. Huebener et al. (2021) find stronger effects for women, identifying parental childcare as the main reason. Due to the closure of daycare centres and schools, the overall amount of care work done by parents increased significantly, and combined with a pre-existing gendered division of care work to place significant stress on mothers (e.g. Jessen et al., 2022, Hipp and Bünning, 2021). The finding that the well-being of mothers was more negatively affected by the pandemic than is the case for fathers is consistent with many studies in different countries (e.g. Möhring et al., 2021, Thorsteinsen et al., 2022, Bourion-Bédès et al., 2023). There is also evidence that gender disparities in mental health impacts depend strongly on restrictive gender ideologies held in households (Thorsteinsen et al., 2022, Hiekel and Kühn, 2023).

According to Westrupp et al. (2021), single parenthood is overall associated with lower well-being during the pandemic (see also Li et al., 2022). Zhou et al. (2020) underline the fragile living conditions of single mothers (labour market performance, owning property such as a house or car, risk for depression) that become even more vulnerable under the circumstances of the COVID-19 pandemic. They explain that single parents stopped working more often during the lockdown and emphasise the crucial role of childcare in times of diminishing availability of usual support networks (grandparents, friends and neighbours). McMillan et al. (2021) study of first-time expectant mothers shows that isolation and quarantine are not necessarily drivers of a decline in mental health. They observed that these measures could reduce maternal stress while increased alcohol use and intimate partner violence as well as changes in prenatal care changes were identified as risk factors.

Many studies found children's age to be an important factor: Comparing parents to

non-parents in Germany Huebener et al. (2021) find the largest decreases for families with young children, likely due to the fact that older children ( $> 10$  years) are less dependent and require less parental attention and care. A positive correlation between the child’s age and parental well-being could also be found for working parents in Vicari et al. (2022) study and in Everri et al. (2022) study of Irish and Italian parents. Hudde et al. (2023) found that the life satisfaction of men with older children (5-15 years) decreased during lockdowns, but this was not the case for men with young children ( $< 5$  years).

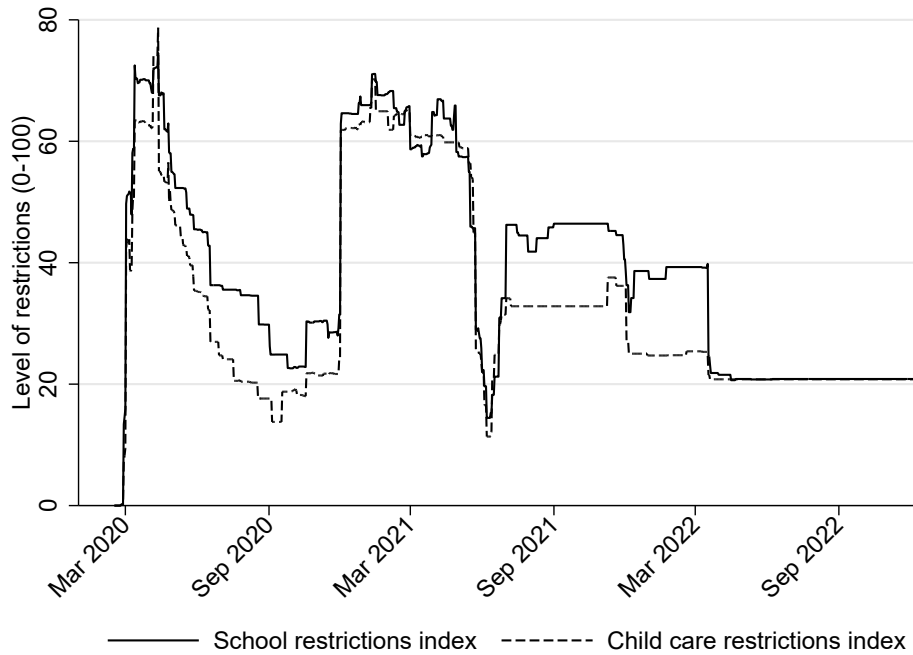
### **3. Institutions and the COVID-19 pandemic in Germany**

Our research focuses on Germany. The onset of COVID-19 in early 2020, the government implemented various containment measures. These included for example social distancing and closures of leisure facilities and shops. One key measure affecting parents and children was the closure of schools and daycare facilities starting March 16, 2020, which heavily disrupted established work and family routines.

Although most facilities reopened by August and September 2020, intermittent closures and restrictions reapplied in subsequent infection waves. With the second substantial infection wave, access to daycare facilities and schools was again heavily restricted from December 2020 onward. In early 2021, only about 45% of children could attend daycare (Autorengruppe Corona-KiTa-Studie, 2022). The level and timing of restrictions varied between regions, but also by educational institution, depending on regional specificities and infection numbers. In later phases of the pandemic, the situation had changed markedly. Despite high infection rates during the Omicron wave in early 2022, the widespread availability of vaccinations allowed for the lifting of most restrictions. Access to daycare and schools was largely restored, though operations continued to be marginally affected by factors like hygiene protocols and staff shortages due to quarantines or infections, impacting care aspects such as opening hours and group structures.

For illustration of restrictions in education institutions, Figure 3 plots an index of restrictions (based on “Corona Strenge Index”, see Healthcare-Datenplattform, 2023) in schools and daycare facilities between March 2020 until the end of 2022. We note substantial variation over the course of the pandemic, but also between schools and daycare facilities.

Figure 1: Restrictions to daycare services and school operations (index)



*Notes:* The figure plots the COVID-19 restrictions index in daycare facilities and schools between March 2020 and December 2022 based on the “Corona Strenge Index” (Healthcare-Datenplattform, 2023). The index was created to make the reaction of governments and the severity of measures comparable and ranges between 0 and 100. It includes various subindices, allowing to differentiate between restrictions applying to daycare, primary and secondary schools.  
*Source:* Own illustration based on “Corona Strenge Index” (Healthcare-Datenplattform, 2023).

## 4. Data

We analyze well-being over the course of the COVID-19 pandemic with the COMPASS panel survey conducted by infratest dimap (2022), a major German polling research institute. The COMPASS survey was specifically designed to survey views on the government’s pandemic response, attitudes towards containment strategies, overall well-being, and concerns in different domains throughout the pandemic. The survey started in March 2020 and collected data in 17 waves until August 2022.

The COMPASS survey is based on a random sample of the “Payback Panel”, the largest bonus program for consumers in Germany with around 30 million consumers from every second household in Germany. Participants are recruited offline and answer the survey online. This limits problems arising from self-selection into online surveys. The COMPASS sample slightly overrepresents higher educated individuals. With individual level weights, the data are representative for those eligible to vote in Germany with online access in terms of gender, age, education, and region (East/West) as in the 2018 German Microcensus. Additional information on the COMPASS survey can be found in the data

report by infratest dimap (2022).

In August 2022, the COMPASS survey asked respondents to reflect on the past two pandemic years and rate the level of stress they experienced in different domains of life. The domains examined include their work situation (if individuals were employed), childcare situation (for those with children in the household), financial situation, family situation, and overall situation. Respondents express the degree of stress felt in each domain on a five-point scale ranging from ‘extremely burdensome,’ ‘strongly burdensome,’ ‘somewhat burdensome,’ ‘barely burdensome,’ and ‘not burdensome at all.’ From these responses, we create dummy variables to capture the proportion of individuals reporting very strong and strong feelings of stress. These dummy variables serve as indicators of significant stress in the respective domains.

To assess well-being during the pandemic, we measure satisfaction with overall life, family life, and childcare as our primary outcomes. Participants rate their own satisfaction in these different areas using an 11-point Likert scale, ranging from 0 (not satisfied at all) to 10 (very satisfied). We consider “individuals with dependent children” to be those who reside in the same household as a child under the age of 16.

We merge the COMPASS data with the COVID-19 restrictions index (“Corona Strengce Index” CSI, see Healthcare-Datenplattform, 2023). This index is inspired by the Oxford Stringency Index and includes data from official regulations on COVID-19 protection measures since March 2020. It was created to make the reaction of governments and the severity of measures comparable. It includes various subindices, allowing to differentiate between restrictions applying to daycare, primary and secondary schools. Additionally, it provides regionally granular information by including regulations from all 401 German counties. This level of detail allows us to exploit regional and time variation in the stringency of COVID-19 protection measures and its impact on well-being. For each subindex, regulations and restrictions are sorted ordinally according to “severity” and assigned a corresponding numerical ranking value between 0 and 100.

## 5. Methods

Our empirical analysis is structured in two parts. In the first part, we aim to explore gender differences in the retrospective perception of stress experienced during the COVID-

19 pandemic with the following simple econometric model:

$$\text{stress}_i^{\text{retro}} = \alpha_0 + \alpha_1 \times \text{female}_i + \epsilon_i \quad (1)$$

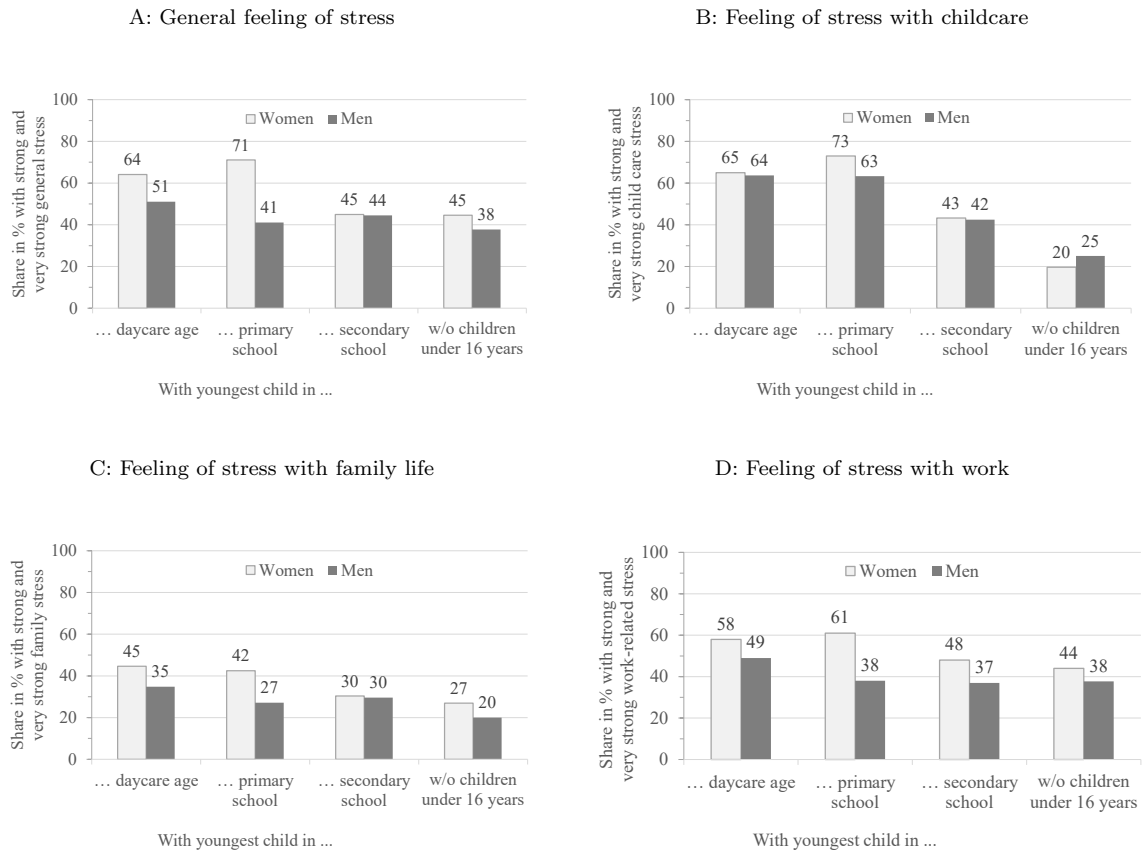
The retrospective assessment of stress,  $\text{stress}_i^{\text{retro}}$ , is regressed on an intercept,  $\alpha_0$ , and a female indicator. The coefficient  $\alpha_1$  estimates gender differences in the feeling of stress. The term  $\epsilon_i$  is the error term for each observation  $i$ . It captures the unexplained variation in the level of stress due to unobserved factors or idiosyncratic shocks. We employ robust standard errors in our estimations to obtain consistent estimates of the standard errors under heteroscedasticity in the error terms. We estimate the model with OLS and apply individual level weighting.

In the second part of our study, we explicitly estimate the impact of specific restrictions and containment measures in educational institutions on individual well-being during the COVID-19 pandemic. These measures include restrictions in daycare facilities, primary schools, and secondary schools. Given that these restrictions vary over time and across counties, we leverage the panel dimension of our data using the following individual-fixed effects model:

$$\text{WellBeing}_{it} = \beta_0 + \beta_1 \times \text{StringencyIndex}_{ct}^{\text{educ}} + \delta_i + \gamma_t + \epsilon_{it} \quad (2)$$

where  $\text{WellBeing}_{it}$  is the well-being of individual  $i$  at time  $t$ , and  $\text{StringencyIndex}_{ct}^{\text{educ}}$  indicates the stringency index in county  $c$  at time  $t$  for the respective educational institution. We assign the stringency index based on the age of the youngest child in a family: parents with children up to six years are assigned the childcare stringency index, those with children aged 6 to 10 years are assigned to the primary school stringency index, and parents with children aged 11 to 16 years are assigned the secondary school stringency index. This age-based assignment is designed to accurately reflect the direct impact of institutional restrictions on families. The term  $\beta_0$  is the intercept,  $\beta_1$  is the coefficient of main interest, capturing the impact of the stringency index on individual well-being when controlling for individual fixed effects,  $\delta_i$ . The error term  $\epsilon_{it}$  captures unobserved variation in well-being. To address potential correlations of the error term within individuals over time, we cluster standard errors at the individual level.

Figure 2: Subjective assessment of feelings of stress during the COVID-19 pandemic



*Notes:* The figure reports the share of individuals reporting of (very) strong feelings of stress during the pandemic. Feelings of stress are assessed retrospectively on a five-point scale ranging from ‘extremely burdensome,’ ‘strongly burdensome,’ ‘somewhat burdensome,’ ‘barely burdensome,’ and ‘not burdensome at all.’ We classify individuals as (very) stressed in a dummy variable indicating if they report extremely burdensome and strongly burdensome experiences. Results are weighted.

*Source:* Own calculations based on COMPASS.

## 6. Results

### 6.1. Overall assessment of stress during the COVID-19 pandemic

In the first part of the analysis, we examine the self-reported stress experienced during the COVID-19 pandemic. Figure 2 shows the self-assessed feeling of stress in general, related to childcare, family life and work in light of the pandemic in August 2022.

Regarding the general feeling of stress (Panel A), approximately 64% of mothers with children in childcare age report strong and very strong feelings of stress. For mothers of primary school-aged children, the percentage increases to 71% reporting high levels of stress. For mothers of older children and women without children in the household, the percentage of those experiencing strong and very strong feelings of stress is 45% for women.

Men, on the other hand, generally report fewer feelings of stress during the pandemic. Approximately 51% of fathers with children in daycare age report strong and very strong feelings of stress. When they have primary school-aged children, the percentage decreases to 41%. For fathers of older children and men without children in the household, the percentage is very similar at 44% and 38%, respectively.

In the realm of childcare stress, a similar pattern emerges (Panel B). Approximately two-thirds of mothers and fathers with children until age 6 experience high or very high levels of stress. For parents of primary school-aged children, this number is even higher for mothers. As we might anticipate, stress related to childcare becomes less pronounced for parents with children in secondary school, and it is only around 20-25% for individuals without children under the age of 16 in the household.

With respect to stress with family life, we can also observe a gradient by the age of the youngest child (Panel C). The younger the child is, the higher is the level of self-assessed stress with family life during the pandemic. 45% of mothers and 35% of fathers with children under the age of 6 experience high or very high levels of stress. For parents of primary school-aged children, this number is slightly lower at 42% for mothers, and 27% for fathers. For parents of older children, the stress with family drops to 30% for mothers. It is at the same level for fathers. Taken together, the first set of descriptive results indicate that women perceived persistently higher levels of stress across different domains, especially when they have children in childcare age (below the age of 6) or in primary school (under age 12).

In a next step of the analysis, we test for the statistical significance of gender differences in (very) strong feelings of stress during the pandemic based on eq. 1 (Table 1). Overall, women report a stronger feeling of stress for the pandemic (column 1) in the realm of overall perceived stress, stress with family life and work. For stress with childcare, we observe a high share of men and women reporting high and very high levels of stress without significant gender differences. When we differentiate between parents with dependent children (column 2) and parents of older children or individuals without children (column 3), we observe that mainly mothers of dependent children perceived significantly higher levels of stress than men. Compared to men, 19 percentage points more women with children below the age of 12 reports of high and very high feelings of stress during the pandemic (column 2). For individuals with older children or no children

Table 1: Gender differences in retrospective feelings of stress experienced during the COVID-19 pandemic

Gender differences in ...	(1)	(2)	(3)
	All	Individuals children < age 12	Individuals with children $\geq$ age 12
(Very) strong feeling of stress overall (retro.)	0.089*** (0.013)	0.190*** (0.032)	0.004 (0.058)
N	8514	1084	350
(Very) strong feeling of stress with child care (retro.)	0.016 (0.027)	0.041 (0.032)	0.008 (0.057)
N	1575	1056	348
(Very) strong feeling of stress with family (retro.)	0.078*** (0.011)	0.120*** (0.032)	0.008 (0.054)
N	8508	1083	350
(Very) strong feeling of stress with work (retro.)	0.080*** (0.016)	0.140*** (0.035)	0.115* (0.060)
N	4999	941	306

*Notes:* The table reports OLS regression results of the female dummy in eq. 1, estimating the gender differences in feelings of (very) strong feelings of stress during the pandemic, assessed retrospectively on a five-point scale ranging from ‘extremely burdensome,’ ‘strongly burdensome,’ ‘somewhat burdensome,’ ‘barely burdensome,’ and ‘not burdensome at all.’ We classify individuals as (very) stressed in a dummy variable indicating if they report extremely burdensome and strongly burdensome experiences. Robust standard errors in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*Source:* Own calculations based on COMPASS.

in the household, the gender gap does not exist (column 3).

## 6.2. Well-being over the course of the pandemic

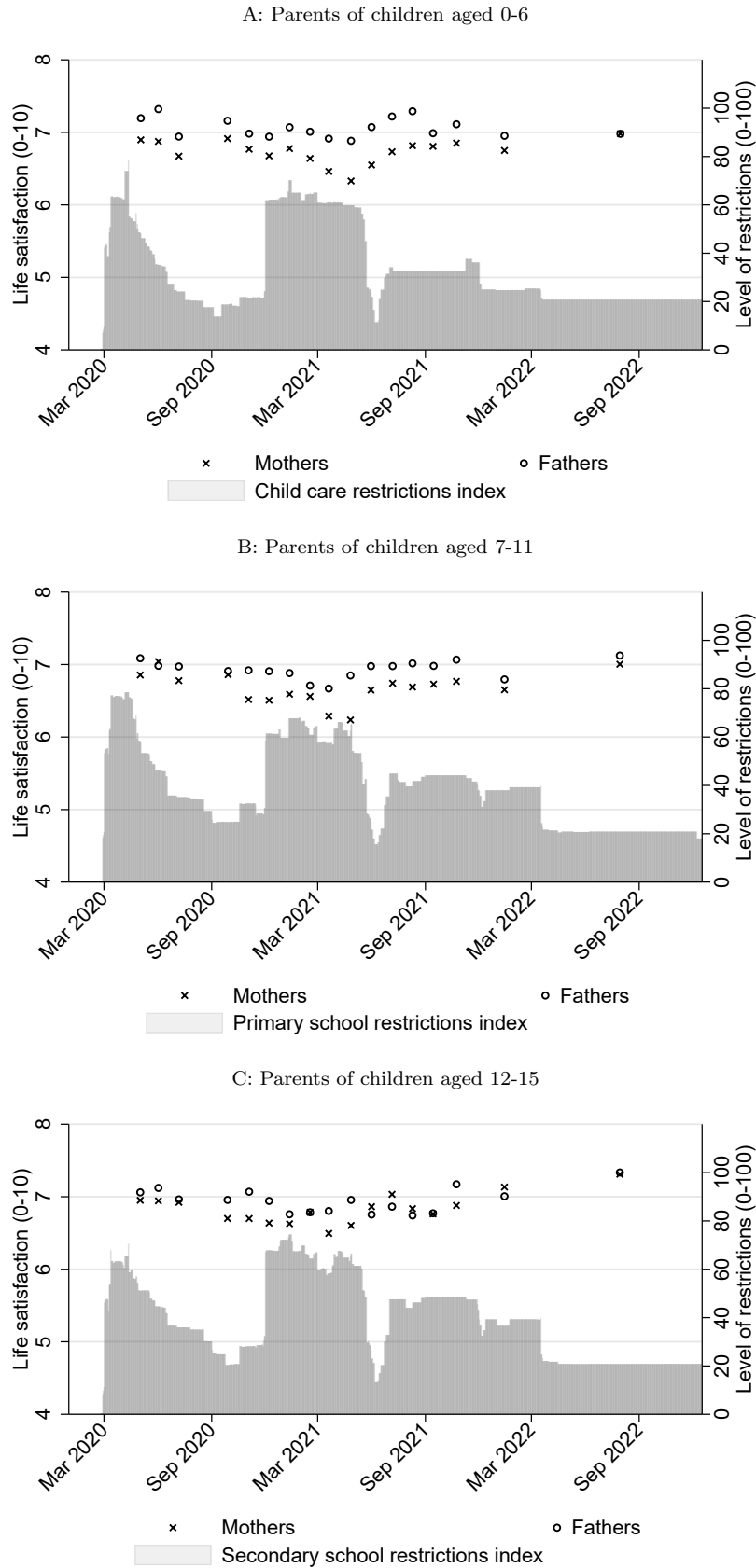
A large body of literature has extensively documented the initial decline in parental well-being at the beginning of the COVID-19 pandemic, as well as during select periods throughout the pandemic. By utilizing data from 17 different time points during the pandemic, we are able to thoroughly examine the progression of parental well-being over time, taking into account the age of the children.

Figure 3 presents data on parental satisfaction with life in general for three distinct groups: parents with children aged 0-6 years (Panel A), parents with children aged 7-11 years (Panel B), and parents with children aged 12-15 years (Panel C). In the spring of 2020, we observe a lower level of life satisfaction among women, particularly mothers with children under the age of 7. Their life satisfaction remains below that of fathers throughout the pandemic until August 2022, when the gap eventually closes. The difference in life satisfaction between mothers and fathers with children aged 7-11 years is similar. For parents of older children, the disparity between mothers and fathers is smaller or non-existent.

We also consider the relationship between the evolution of life satisfaction and the



Figure 3: Life satisfaction of parents over the course of the pandemic



Notes: The figure plots individual's satisfaction with life in general over the course of the COVID-19 pandemic in Germany for men and women by age of the youngest child in the household. Grey-shaded areas show the level of restrictions in daycare facilities and schools during the time of the interview. Satisfaction with life in general is measured on a scale from 0 (not satisfied at all) to 10 (very satisfied).

Source: Own illustration based on COMPASS and Corona-Streng-Index.

Table 2: Link between child care and school containment measures and parental well-being

Satisfaction with...	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Effect of Restrictions in ...							
	All Educ. Inst.		Daycare		Primary Schools		Secondary Schools	
	Women	Men	Women	Men	Women	Men	Women	Men
Life in General	-0.187*** (0.055)	-0.036 (0.052)	-0.163** (0.082)	-0.038 (0.080)	-0.142 (0.110)	-0.079 (0.091)	-0.288*** (0.101)	-0.004 (0.110)
N	14748	12978	6681	5962	3949	3756	4118	3260
Family Life	-0.352*** (0.105)	-0.140 (0.108)	-0.175 (0.166)	-0.206 (0.162)	-0.381* (0.206)	0.099 (0.206)	-0.742*** (0.195)	-0.258 (0.260)
N	6295	5451	2859	2485	1659	1590	1777	1376
Childcare	-1.073*** (0.173)	-0.613*** (0.178)	-1.033*** (0.274)	-0.201 (0.294)	-1.212*** (0.340)	-1.319*** (0.281)	-1.070*** (0.346)	-0.795** (0.373)
N	6294	5451	2858	2485	1659	1590	1777	1376

*Notes:* The table reports fixed effects regression results of well-being on an index of restrictions in child care, primary school and secondary school for parents with youngest children in the respective age group. Individual fixed effects. Standard errors clustered at county level in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*Source:* Own calculations based on COMPASS and Corona-Streng-Index.

level of restrictions imposed to educational institutions. Our findings indicate that higher levels of restrictions correspond to lower levels of life satisfaction. Additionally, in the spring of 2021, we observe that satisfaction declines as measures are maintained for a longer period of time.

By April and May 2021, women reached a minimum level of well-being, coinciding with a period of severe restrictions in educational institutions that had already lasted for several months. Mothers appear to be more sensitive to these restrictions, as their decline and subsequent recovery in well-being is more pronounced compared to men. However, by August 2022, when most restrictions in educational institutions were lifted, the well-being of mothers caught up to a similar level as that of men.

### 6.3. Linking restrictions in educational institutions to well-being

In the third segment of our analysis, we delve into the relationship between various well-being metrics and the stringency of containment measures in educational institutions. This examination capitalizes on the temporal and geographical variations in restrictions, while also considering the age of the youngest child in each family.

The results of our empirical model outlined in eq. (2) are reported in Table 2. Our findings reveal notable gender-based disparities. Specifically, we observe that escalating the restrictions index from 0 to 1 correlates with a significant reduction in life satisfaction among mothers, by 0.187 points (column 1). In contrast, this association is not statis-

tically significant for fathers, where the coefficient is -0.036 (column 2). This pattern persists when analyzing data segmented by the age of the youngest child, with a pronounced impact on mothers' life satisfaction, but negligible effects for fathers. However, for both mothers and fathers of primary school-aged children, the coefficients are not statistically significant.

In examining satisfaction with family life, the trend is similar. Mothers experience a statistically significant decrease in satisfaction (-0.352), whereas for fathers, the change (-0.14) is not statistically significant. This trend is particularly pronounced among mothers with school-aged children, especially those with older children.

The domain of childcare satisfaction reveals a significant negative correlation for both genders in response to tighter restrictions. However, the impact is more profound for mothers, with a coefficient of -1.07, nearly double that of fathers. Intriguingly, among parents with childcare-aged children, only mothers exhibit a significant correlation between childcare satisfaction and the restrictions index. Conversely, for parents with children in primary and secondary school, fathers' satisfaction with childcare also shows a notable connection to the restrictions index.

Additional results show that restrictions are also linked to parental concerns about children's education. Mothers and, to a lesser extent, fathers of school-aged children become significantly more concerned about their child's education when restrictions are more severe. Mothers have similar concerns regarding restrictions to child care but fathers do not, suggesting that mothers may perceive a significant educational role of child care institutions.<sup>3</sup> Concerns about the own economic situation, own health, children's future or children's health are not affected by the restrictions in educational institutions (results are reported in Appendix Table A.1).

These findings underscore the differential impact of educational restrictions on the well-being of mothers and fathers, highlighting a gender-specific burden borne predominantly by mothers during the pandemic. The only significant estimates for men are where closures reduced their satisfaction with education and care of their school-aged child. For mothers, on the other hand, there are significant impacts on education and

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<sup>3</sup>Indeed, a vast economic literature demonstrates the importance of child care for children's development and later life outcomes e.g. in terms of educational performance and adult earnings (see e.g. Currie and Almond, 2011, for a review).

care concerns as well as on their general life satisfaction due to both school and day care closures, reflecting the unequal gender division of childcare responsibility, especially at younger ages.

## **7. Conclusion**

It is widely documented that well-being was negatively impacted by the COVID-19 pandemic. Furthermore, the size of the impacts have been shown to be significantly larger for women than men, as well as being larger during the more severe phases of the pandemic and most strongly hit locations. We are able to make use of unique dataset from Germany to provide additional insights showing that that the severity of restrictions to school and daycare operation causally impacts parental well-being negatively, especially for mothers of young children. These findings have several implications for the handling of possible future pandemics. The benefits in terms of reduced transmission from closures of school and daycare must be weighed carefully against the costs to parental well-being and other costs (e.g. to children's well-being, and their education). We also recommend directing additional support for those suffering from exacerbated mental health issues during pandemics.

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## Appendix

Table A.1: Effects of Day Care and School Closures on Parental Concerns

	(1)	(2)	(3)	(4)	(5)	(6)
	Child Care		Effect of restrictions in ... Primary Schools		Secondary Schools	
	Women	Men	Women	Men	Women	Men
Great concern about own economic situation	-0.003 (0.025)	-0.025 (0.024)	-0.008 (0.031)	0.008 (0.029)	-0.050 (0.031)	-0.005 (0.035)
N	4618	3958	2647	2477	2774	2160
Great concern about own health	0.021 (0.022)	-0.003 (0.020)	0.000 (0.032)	-0.011 (0.029)	0.026 (0.029)	0.014 (0.031)
N	4618	3958	2647	2477	2774	2160
Great concern about child future	-0.032 (0.064)	-0.046 (0.055)	0.062 (0.071)	0.010 (0.060)	0.073 (0.064)	0.092 (0.081)
N	1737	1607	1064	1028	1138	858
Great concern about own health	-0.021 (0.065)	-0.004 (0.058)	-0.001 (0.071)	0.015 (0.058)	0.001 (0.070)	-0.011 (0.083)
N	1737	1607	1064	1028	1138	858
Great concern about child education	0.197*** (0.066)	0.067 (0.063)	0.306*** (0.079)	0.223*** (0.075)	0.344*** (0.079)	0.247*** (0.075)
N	1737	1607	1064	1028	1138	858

*Notes:* The table reports regression results of well-being on an index of restrictions in child care, primary school and secondary school for parents with children in the respective age group. Individual fixed effects. Standard errors clustered at county level. *Source:* Own calculations based on COMPASS and Corona-Streng-Index.